

## UNITED STATES PATENT OFFICE

## Utility Patent Application

**AN ALGORITHM FOR ADJUSTING EDGES OF GRAYSCALE PIXEL-MAP IMAGES**

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**ABSTRACT OF THE INVENTION**

10 An algorithm (method) for sizing (adjusting edges of) grayscale or dose level pixel-maps  
(raster images) real time for input into radiant beam lithography systems or similar dose level  
grayscale image rendering systems to compensate for systemic distortions such as edge bias  
and/or loss of linearity (i) successively assembles one or more frame matrixes of grayscale  
values from a parent pixel-map having edges and corners where an edge is defined by gray  
pixels having values between 1, 2, ..., n, or by pixels having at least one black (0-gray or dose  
level) neighbor; (ii) slides a sub-matrix window within each frame matrix, to find, calculate and  
15 store values for gradients perpendicular to the edges, and any corner within each frame matrix;  
(iii) loops over pixels within such sub-matrix window at each position within the frame matrix to  
adjust the grayscale value of each edge pixel found; and (iii) propagates a grayscale correction  
value to pixels inward or outward per the computed perpendicular gradient to establish a new  
edge position within each frame matrix, and where there is more than one frame matrix, (iv)  
20 reassembles the frame matrixes, thereby, generating a daughter grayscale or dose level pixel-map  
which upon projection and recording compensates for systemic distortions.